

Reinstatement of the independent specific status of *Camellia angustifolia*, a tea plant (*Camellia* sect. *Thea*, Theaceae) from Guangxi, China

Huiqun Deng^{1,2,3}, Xianjun Liao^{1,2,3}, Xiangqin Yu⁴, Zhusheng Liu^{1,2,3}, Shixiong Yang⁴

¹ Guangxi Key Laboratory of Tea Plant Germplasm Innovation and Resource Utilization, Guangxi Research Institute of Tea Science, Guilin 541004 Guangxi, China

² Guilin Field Scientific Observation and Research Station for Crop Germplasm Resources, Ministry of Agriculture and Rural Affairs, Guilin 541004 Guangxi, China

³ Guangxi Field Scientific Observation and Research Station for Tea Resources, Guilin 541004 Guangxi, China

⁴ CAS Key Laboratory for Plant Diversity and Biogeography of East Asia, Kunming Institute of Botany, Chinese Academy of Sciences, Kunming 650201, Yunnan, China

Corresponding authors: Shixiong Yang (shxyang@mail.kib.ac.cn); Zhusheng Liu (glxlg0397@163.com)

Abstract

Camellia angustifolia Hung T. Chang was published in 1981 and was treated as a synonym of *C. sinensis* var. *pubilimba* in 1992. Field investigation and herbarium research have revealed remarkable morphological differences between *C. angustifolia* and *C. sinensis* var. *pubilimba*. Evidence from morphology—particularly the variations in indumentum on young branches, leaves, and flowers, the size of the sepals, and the thickness of the pericarp—suggests that *C. angustifolia* should not be reduced to *C. sinensis* var. *pubilimba*. We hereby reinstate the independent specific status of *C. angustifolia*. A detailed description, including the flower morphology of *C. angustifolia*, is provided. In addition, the incorrect information regarding the type specimen in the protologue of *C. angustifolia* has been rectified.

Key words: *Camellia sinensis* var. *pubilimba*, morphology, taxonomic treatment, Theaceae



Academic editor: Peter de Lange

Received: 12 October 2025

Accepted: 19 November 2025

Published: 28 November 2025

Citation: Deng H, Liao X, Yu X, Liu Z, Yang S (2025) Reinstatement of the independent specific status of *Camellia angustifolia*, a tea plant (*Camellia* sect. *Thea*, Theaceae) from Guangxi, China. *PhytoKeys* 267: 1–8. <https://doi.org/10.3897/phytokeys.267.174664>

Copyright: © Huiqun Deng et al.

This is an open access article distributed under terms of the Creative Commons Attribution License (Attribution 4.0 International – CC BY 4.0).

Introduction

Camellia angustifolia Hung T. Chang was described as a new member of the *Camellia* L. sect. *Thea* Griffith, based on a fruit specimen collected from Dayaoshan County (current Jinxiu County), Guangxi, China (Chang 1981a). In the protologue, the author stated that the species was similar to *C. sinensis* (L.) Kuntze but differed by its branchlets and leaves glabrous, leaves narrow lanceolate, pericarp thick (4–5 mm) and sepals large (6–9 mm long) (Chang 1981a). Ming (1992) pointed out that the large sepals of *C. angustifolia* did not represent a significant difference from *C. sinensis*, because sepal enlargement during the fruiting period was not uncommon in the latter. Therefore, he reduced *C. angustifolia* to the synonymy of *C. sinensis* var. *pubilimba* Hung T. Chang.

Since the 1990s, we have been searching for *C. angustifolia* in its type locality and the surrounding areas. We had sporadically collected a few specimens that were suspected to be of this species outside its type locality in the early

days, but it was not until 2021 that we finally confirmed the discovery of this plant in its type locality. Subsequently, additional specimens of this plant at various developmental stages (from flower bud, open flower, and young fruit to mature fruit) were collected from a wider range of locations. After careful scrutiny of the literature, specimens (including type material), and living plants, it is concluded that *C. angustifolia* is remarkably different from *C. sinensis* var. *pubilimba* in morphology and should be reinstated as an independent species.

Materials and methods

Relevant specimens of *C. sect. Thea*, including the type material of *C. angustifolia* and *C. sinensis* var. *pubilimba*, conserved at herbaria IBK, IBSC, KUN, PE, and SYS (acronyms based on Thiers (2025, continuously updated)), and taxonomic literature were checked. Field collections and observations were also conducted on the living plants of these two taxa.

Results and discussion

The valid publication

Camellia angustifolia was published as a new species in 1981 by the same author in two publications (Chang 1981a: 96 and 1981b: 119), with the same type. Chang (1981a) was published in February 1981, earlier than Chang (1981b) (April 1981), so it is the valid publication (Art. 6 Note 2 of the ICN).

The type specimens

In the protologue of *C. angustifolia*, a single collection, Y.K. Li 400644 deposited in IBSC, was designated as the type (Chang 1981a). Two sheets of this collection were found in IBSC and IBK, respectively. However, both of them are definitely not *C. angustifolia* but *Platycodon grandiflorus* (Jacq.) A. DC., a member of the family Campanulaceae. After careful research, it was confirmed that Chang (1981a, b) provided an incorrect specimen number, which was followed by Chang and Bartholomew (1984) and Ming (1992, 2000). A nearby collection, Y.K. Li 400664, is actually the type of *C. angustifolia*. We found two sheets of this collection in IBSC and IBK, respectively. On the sheet in IBSC (IBSC0003466, holotype), there is a nomenclature label “*Camellia angustifolia* Chang, sp. nov.” handwritten by Zhang Hongda (Hung T. Chang) in September 1975, and a “Typus” stamp (Fig. 1A). On the sheet in IBK (IBK00190495, isotype), there is a label “isotypus of *C. angustifolia*,” which should have been written by T.L. Ming based on the handwriting (Fig. 1B).

It is worth noting that there are differences in collection information between the holotype and the isotype. The collection record of the isotype provides comprehensive collection information, including the collector, collection number, collection date (16 July 1958), collection locality (Dayaoshan County as well as detailed sublocations), habitat, altitude, life form, and morphological characteristics of leaves and fruits, as well as uses, etc. (Fig. 1B). However, on the collection record sheet of the holotype, in addition to providing the same collector and collection number as the isotype, only the collection date (9 July

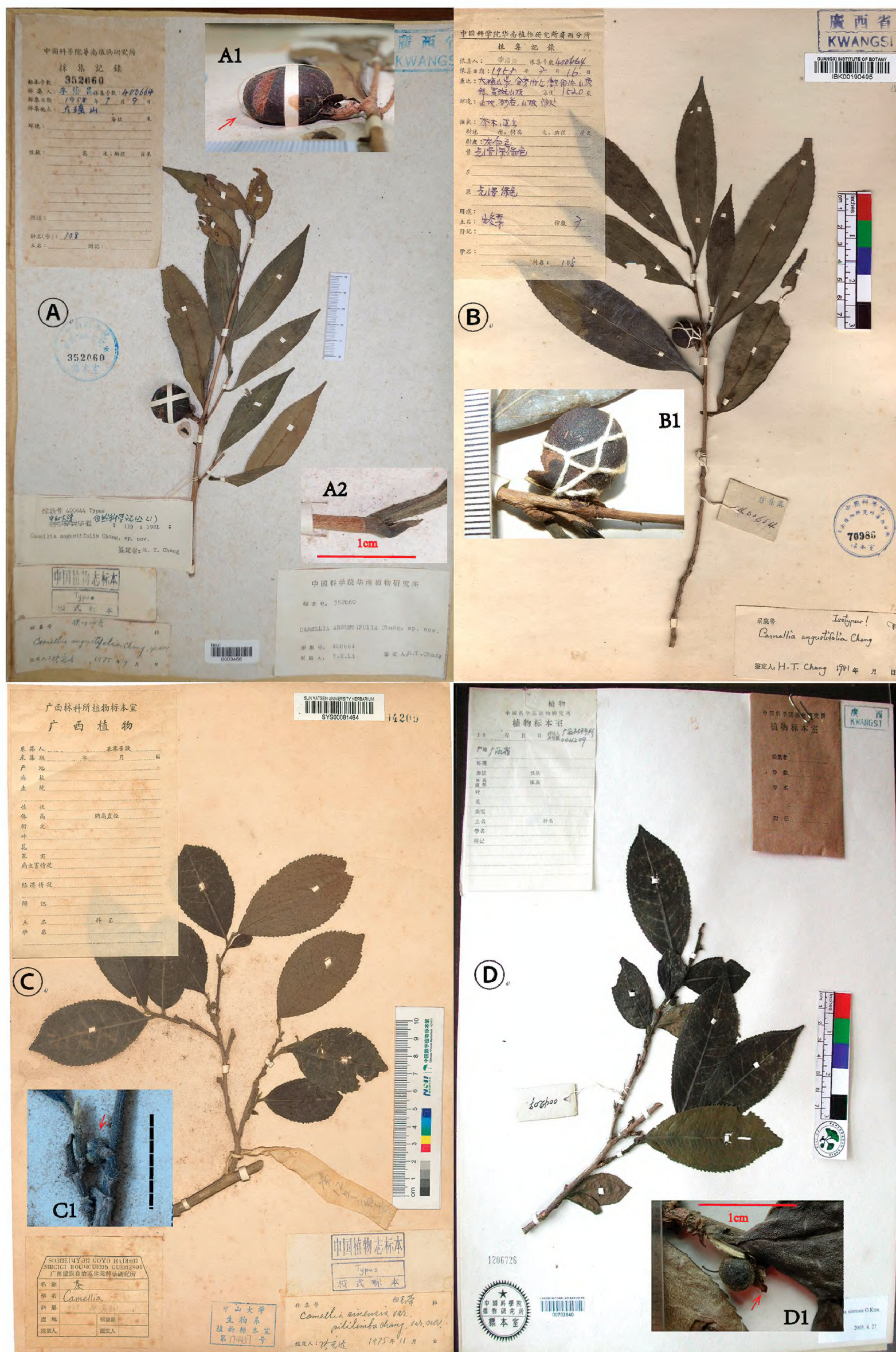


Figure 1. Type specimens. **A.** Holotype of *C. angustifolia* (IBSC); **A1.** Showing the thick pericarp (arrow: the thinnest part); **A2.** showing the glabrous branchlet, petiole, and the terminal bud with sparse pubescence; **B.** Isotype of *C. angustifolia* (IBK); **B1.** Showing the shape of the fruit and the large glabrous sepals; **C.** Holotype of *C. sinensis* var. *pubilimba* (SYS); **C1.** Showing the hairy terminal bud, branchlet, and petiole, as well as the small, abaxially hairy sepals (arrow: sepals); **D.** Isotype of *C. sinensis* var. *pubilimba* (PE); **D1.** Showing the obvious indumentum on the terminal bud, branchlet, petiole, abaxial leaf surface, and the adaxial surface of the sepals (arrow: sepals). **A.** Photographed by Yunfei Deng; **B, D.** Photographed by Shixiong Yang; **C.** Photographed by Qiang Fang and Lijuan Luo.

1958) and locality (Dayaoshan), which differ from those of the isotype, were noted (Fig. 1A). By checking the collector’s record book (Yinkun Li), which is stored in IBK, it was finally confirmed that the collection information attached to the isotype is correct.

The holotype (not in good condition) and an isotype of *C. sinensis* var. *pubilimba* were traced from SYS (SYS00081464) and PE (PE00702640), respectively, and were collected in Lingyun, Guangxi, China (Fig. 1C, D). We also collected substantial specimens of this taxon from its type locality and the surrounding area.

Morphological analysis

All specimens, including the types and living plants in the wild, reveal that *C. angustifolia* is remarkably distinct from *C. sinensis* var. *pubilimba*, as evidenced by an array of morphological characters (Table 1 and Figs 1–3). The main differences are as follows.

Firstly, *C. sinensis* var. *pubilimba* is primarily diagnosed by the presence of obvious indumentum on the young branches, the back of the leaves, the petioles, the pedicels, and the abaxial surfaces of the perianths (sepals and petals) (Chang 1981a, b) (Figs 1C, C1, D, D1, 3D, F). In contrast, the corresponding parts of *C. angustifolia* are glabrous (Figs 1A, A2, B, B2, 2C, D, E), which was seriously overlooked when Ming (1992) reduced *C. angustifolia* to *C. sinensis* var. *pubilimba*.

Secondly, the sepals of *C. angustifolia* (Figs 1B1, 2C) are significantly larger than those of *C. sinensis* var. *pubilimba* (Figs 1C1, D1, 3D) (5–9 mm long vs. 2–4 mm). This constitutes a stable difference between the two taxa and contradicts the view of Ming (1992).

Thirdly, the fruits of *C. angustifolia* are globose (Figs 1A, B, 2C), whereas those of *C. sinensis* var. *pubilimba* are usually triangular oblate (Fig. 3C). What is particularly noteworthy is that the pericarp of *C. angustifolia* is thicker than

Table 1. Morphological comparison between *Camellia angustifolia* and *C. sinensis* var. *pubilimba*.

Character	<i>C. angustifolia</i>	<i>C. sinensis</i> var. <i>pubilimba</i>
Life form	arbor, 10–20 m tall	shrub, 1–3 (–5) m tall
Terminal buds	sparsely to densely pubescent	densely pubescent
Branchlet	glabrous	pubescent
Abaxial surface of leaf blade	glabrous	pubescent
Diameter of flower	4–5 cm	2.5–3.5 cm
Pedicel	6–12 mm long, glabrous	5–10 mm long, pubescent
Size of sepals	5–9 mm	2–4 mm
Indumentum of sepals	outside glabrous, inside sericeous	outside pubescent, inside sericeous
Size of petals	1.5–3 × 1.5–2 cm	1.5–2 × 1.2–2 cm
Indumentum of petals	glabrous on both surfaces	outside pubescent
Ovary	3-loculed, densely tomentum	3-loculed, densely tomentum
Style	1.6–2 cm long, pubescent almost the entire length	ca. 1 cm long, glabrous or base pubescent
Shape of fruit	globose	triangular oblate
Size of fruit	3–4 cm in diam.	2–3 cm in diam.
Thickness of pericarp	2–3 mm	≤1 mm



Figure 2. *Camellia angustifolia* Hung T. Chang. A. Habit; B. Flowering branch. C. Young fruit with sepals; D. Young branch with terminal bud and petiole; E. The back of a leaf; F. Pistil. A, B, D. From S.X. Yang & P.M. Ye 6755 (KUN); C. From S.X. Yang & P.M. Ye 6756 (KUN); E, F. From S.X. Yang & P.M. Ye 6757 (KUN). Photographed by Shixiong Yang.

that of *C. sinensis* var. *pubilimba*. The description “pericarpio 4–5 mm crasso” in the protologue of *C. angustifolia* (Chang 1981a) was not entirely accurate. This refers to the thickness of the pericarp around the fruit tip, where it is the thickest (Fig. 1A1). In fact, the thinnest part of the pericarp is only 2–3 mm thick (as indicated by the arrow in Fig. 1A1), but it is still obviously thicker than that of *C. sinensis* var. *pubilimba*, of which the pericarp thickness is usually about 1 mm or even thinner (Ming 2000; Ming and Bartholomew 2007) (Fig. 3B).

Additionally, regarding life form, *C. angustifolia* is mostly a tall tree, with the tallest individuals reaching up to about 20 m in height (Fig. 2A). In contrast, *C. sinensis* var. *pubilimba* typically grows as a shrub that is only 1–3(–5) m tall (Fig. 3A).

Based on these significant differences between the two taxa, Ming (1992)’s taxonomic treatment reducing *C. angustifolia* to *C. sinensis* var. *pubilimba* was unreasonable. *Camellia angustifolia* should be regarded as a separate species.

Taxonomic treatment

Camellia angustifolia Hung T. Chang

Camellia angustifolia Hung T. Chang in Acta Sci. Nat. Univ. Sunyats. 20 (1): 96 (Tax. Gen. *Camellia* 119).1981 et 23 (1): 9. 1984; Hung T. Chang & B. Bartholomew, Camellias 147, pl. 48. 1984; Hung T. Chang in Fl. Guangxi 1: 787. 1991; Hung T. Chang, Fl. Reip. Pop. Sin. 49 (3): 129, pl. 31: 2. 1998.



Figure 3. *Camellia sinensis* var. *pubilimba* Hung T. Chang. A. Habit; B, C. Fruit; D. Flowering branch; E. Pistil; F. The back of a leaf. A–C. From S.X. Yang 5528 (KUN); D–F. From S.X. Yang 6556 (KUN). Photographed by Shixiong Yang.

= *C. sinensis* var. *pubilimba* auct. non Hung T. Chang: T.L. Ming in Acta Bot. Yunnan. 14 (2): 129. 1992 et in Monogr. *Camellia* 135. 2000; T.L. Ming & B. Bartholomew, Fl. China 12: 377. 2007, quoad syn. *C. angustifolia*.

Type. CHINA Guangxi: • Jinxiu, in shade on slope, 1520 m, 16 July 1958, Y.K. Li 400664 (holotype: SCBI0003466!; isotype: IBK00190495!) (Fig. 1A, B).

Description. Evergreen arbor, 10–20 m tall. **New branchlets** glabrous, **terminal buds** sparsely to densely pubescent. **Petioles** 5–10 mm long, glabrous; **leaf blades** lanceolate, oblong to elliptic, 7–13 × 2–5 cm, coriaceous, abaxially yellowish green, glabrous or subglabrous, adaxially dark green, glabrous, shiny, midrib and secondary veins abaxially elevated and adaxially impressed, secondary veins 10–13 pairs, base cuneate, apex acuminate, margin serrulate. **Flowers** axillary, solitary or paired, 4–5 cm in diam. **Pedicels** 6–12 mm long, glabrous. **Bracteoles** 2 (–3), caducous. **Sepals** 5, persistent, suborbicular, 5–9 × 5–10 mm, abaxially glabrous, adaxially sericeous, margin ciliolate. **Petals** 7–8 in 1–2 whorls, white, elliptic to obovate, 15–30 × 15–20 mm, glabrous on both surfaces, apex obtuse to rounded, inner 4–5 petals basally connate to each other and adnate to the filament tube for 3–4 mm. **Stamens** numerous, 18–22 mm long, in 2–3 whorl; **filaments** glabrous, filaments of the outer whorls basally connate for 3–5 mm, filaments of the innermost whorl free. **Ovary** 3-loculed, globose to ovoid, densely tomentum. **Styles** 1, 16–20 mm long, pubescent almost the entire length, apically 3-lobed for 3–5 mm. **Capsule** globose, 3–4 cm in diam., 3-loculed with 1–2 seeds per locule; pericarp 2–3 mm thick. **Seeds** fuscous, globose, ca. 1.5 cm in diam., glabrous. Figs 1A, B, 2.

Phenology. Flowering September–October, fruiting August–September.

Distribution and habitat. Endemic to northern Guangxi, China (Fig. 4), in the evergreen broadleaf forest at the elevations of 930–1390 m.

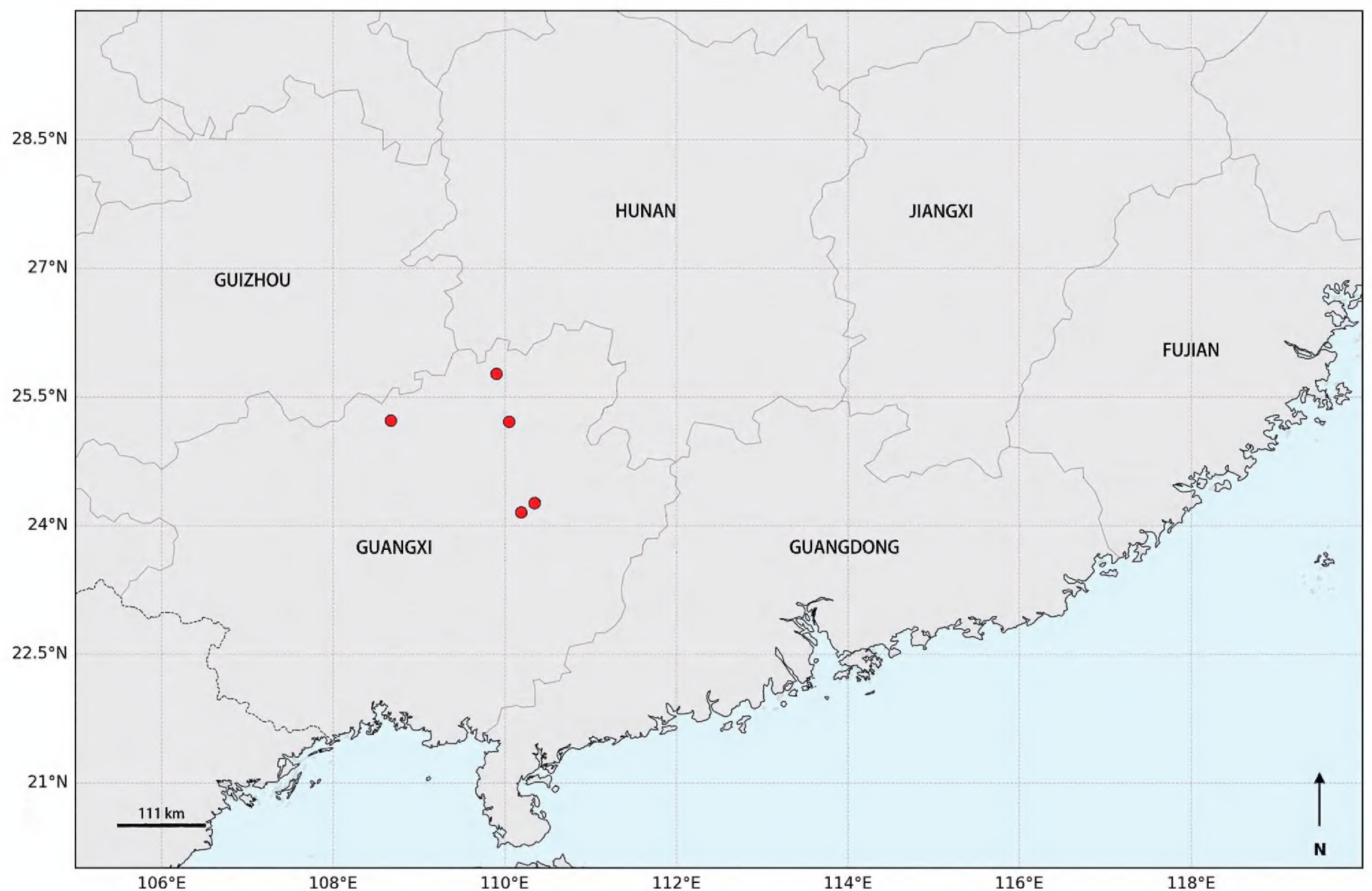


Figure 4. The distribution of *Camellia angustifolia* Hung T. Chang (made by Hanning Duan).

Additional specimens examined. CHINA Guangxi: • **Jinxiu**, 14 September 2021, S.X. Yang & P.M. Ye 6752, 6753, 6754, 6755, 6756, 6757 (KUN); 16 February 2023, S.X. Yang, P.M. Ye et H.M. Tan 7060, 7061, 7062, 7063, 7064, 7065, 7066, 7067, 7068, 7069 (KUN). • **Lingui**, 15 February 2025, S.X. Yang, Z.S. Liu, Y.L. Pan, H.Q. Deng et H.L. Xiao 7811, 7812, 7813, 7814, 7815, 7816, 7817, 7818, 7819, 7820, 7821, 7822, 7823, 7824 (KUN). • **Longsheng**, 1 May 2025, S.X. Yang, H.Q. Deng et X.Y. Wang 7941, 7942, 7944, 7945 (KUN). • **Rongshui**, 21 July 2014, X.Q. Yu YXQ125 (KUN); 3 May 2025, S.X. Yang, Z.S. Liu et H.Q. Deng 7959, 7960, 7961, 7962, 7963 (KUN).

Acknowledgments

The staff of the herbaria listed in the materials and methods above are thanked for making the specimens available. Appreciation is extended to Mr. Haiming Tan of Dayaoshan National Nature Reserve (Jinxiu, Guangxi) and Mr. Pinming Ye of Nanning Golden Camellia Park, Guangxi, for their help during field expeditions; Prof. Yunfei Deng of the South China Botanic Garden, Chinese Academy of Sciences, and Profs. Qiang Fan and Lijuan Luo of Sun Yat-sen University for providing important photographs; Dr. Yusong Huang of IBK for assistance in checking the original collection information of the types; Ms Jiixin He of Guangxi Research Institute of Tea Science and Dr. Hanning Duan of the Kunming Institute of Botany, Chinese Academy of Sciences, for help in preparing Figs 1–3 and Fig. 4, respectively.

Additional information

Conflict of interest

The authors have declared that no competing interests exist.

Ethical statement

No ethical statement was reported.

Use of AI

No use of AI was reported.

Funding

This work is funded by the National Natural Science Foundation of China (32270224) and GARSIT-Tea (nycytxgxcxtd-2024-18).

Author contributions

Conceptualization: SXY, ZSL. Investigation and methodology: HQD, XJL, XQY, ZSL, SXY. Resources and visualization: HQD, XQY, SXY. Writing—original draft: HQD, SXY. Writing—review and editing: HQD, SXY.

Author ORCIDs

Huiqun Deng  <https://orcid.org/0009-0004-1622-9923>

Xianjun Liao  <https://orcid.org/0009-0002-3839-022X>

Xiangqin Yu  <https://orcid.org/0000-0001-5245-343X>

Zhusheng Liu  <https://orcid.org/0009-0004-2879-9317>

Shixiong Yang  <https://orcid.org/0000-0001-8472-1275>

Data availability

All of the data that support the findings of this study are available in the main text.

References

- Chang HT (1981a) *Thea*—A Section of Beveragial Tea-Trees of the genus *Camellia*. *Acta Scientiarum Naturalium Universitatis Sunyatseni* 20(1): 87–99.
- Chang HT (1981b) A Taxonomy of the Genus *Camellia*. The Editorial Staff of the Journal of Sun Yatsen University, Guangzhou, 180 pp.
- Chang HT, Bartholomew B (1984) *Camellias*. Timber Press, London, 211 pp.
- Ming TL (1992) A Revision of *Camellia* sect. *Thea*. *Yunnan Zhi Wu Yan Jiu* 14(2): 115–132.
- Ming TL (2000) Monograph of the Genus *Camellia*. Yunnan Science and Technology Press, Kunming, 352 pp.
- Ming TL, Bartholomew B (2007) Theaceae. In: Wu ZY, Raven PH, Hong DY (Eds) *Flora of China* (Vol. 12). Hippocastanaceae through Theaceae. Science Press, Beijing / Missouri Botanical Garden Press, St. Louis, 366–478.
- Thiers BM (2025) Index Herbariorum. <http://sweetgum.nybg.org/science/ih/> [Accessed 15 October 2025]